CCR #96-0488a

SOW Changes for DID 603

3.8.1.5 Operational Readiness and Performance Assurance

The Contractor shall be responsible for generating and maintaining an Operational Readiness Plan in accordance with DID 603/OP1 that ~~ensures elements are in a state of operational readiness at all times, including preparations for mission launches and sustaining levels of performance of hardware, firmware, software, and personnel for which the Contractor has M&O responsibility. This document shall include the Contractor's plan for managing Operational Readiness Reviews. The Operational Readiness Plan must provide for regular monitoring of M&O activities under this contract and provide visibility to both the CO/COTR and program management~~. **describes the activities for preparing, verifying, and reviewing the operational readiness of all ECS M&O staff, procedures, hardware, software, and databases in preparation for ECS system and mission change events.** The Contractor's PAIP (DID 501/PA1) shall include coverage of the operational phase activities of the ECS. Requirements of GSFC 420-05-03 pertinent to the maintenance and operation of the system shall be implemented.

SOW Changes for DID 603 (continued)

3.8.1.5.1 Operational Readiness

~~The Contractor shall develop, implement, and maintain staffing, training, scheduling, and testing procedures that ensure continuous operational readiness of the elements/sites for which he is responsible. This requirement includes the development of the Staffing Plan section of the Operational Readiness Plan (DID 603/OP1) and ensuring that staffing is provided according to the plan. The Staffing Plan shall include provisions for the gradual build-up for a Flight Operations Team (FOT) that will assume operations of the EOC from the spacecraft contractor approximately three months after the launch or successful checkout, whichever is later.~~

~~The Contractor shall establish plans and procedures in the Hardware Readiness section of the Operational Readiness Plan (DID 603/OP1) for ensuring the operational readiness of equipment and facilities.~~

~~The Contractor shall establish plans and procedures in the Software Readiness section of the Operational Readiness Plan (DID 603/OP1) for ensuring the operational readiness of software and firmware delivered by the Contractor and accepted by the IATO and for externally developed (non-ECS) software which has successfully passed operational verification and operational testing. The Software Readiness section of the plan shall insure that software and firmware management and configuration management activities are implemented on software and firmware maintenance tasks and shall provide rigorous discipline for deliveries, discrepancy reporting, implementation, and tracking. The plan shall ensure visibility into software and firmware status for both the CO/COTR and program management.~~

For each system or change event (e.g. Release-A, TRMM operations, Release-B, AM-1 operations), the activities required for training, development of procedures and databases, testing of hardware and software, verification of those elements (ops exercises, readiness rehearsals) and the readiness reviews will be described in the Operational Readiness Plan (DID 603/OP1). The responsibilities for planning, execution, reporting and approval of the activities will be included. The phasing of readiness activities to their events will also be described, but their specific schedules will be developed and maintained separately since they are subject to frequent change.

SOW Changes for DID 605 and 609

3.3.2.6 Other Systems Engineering Activities

The Contractor shall prepare an Individual Facility Requirements document in accordance with DID 302/DV1 (P) 302/DV2 (F) that addresses each of the ECS sites. The Contractor shall generate requirements consistent with the facilities actually available at each specific site; the need for additional facility requirements shall be justified. This document shall contain physical layouts of existing equipment as installed in the facilities and show how the new ECS equipment shall be accommodated in the facilities. This document shall also contain the electrical power, grounding, fire alarm, acoustical, and air conditioning requirements.

The Contractor shall establish and maintain a field office at each DAAC throughout the term of the contract. The Contractor shall use these offices to collect requirements and site-specific information during the early phases of the contract, to support installation and testing during the integration phase of the contract, to provide training, and to provide maintenance and operations, including debugging and other problem resolution, for the remainder of the contract.

The Contractor shall ~~define and document display formats for the elements with significant operator interactions and provide an Operations Scenarios document for those elements~~ **describe the operability of the system design through use of example Scenarios,** in accordance with DID 605/OP2. The Contractor shall also ~~define element and subsystem Operations and Maintenance Procedures~~ **prepare an Operations Tools Manual** in accordance with DID 609/OP1.

SOW Changes for DID 607 and 611

3.8.3.1 Development of Maintenance and Operations Material

The Contractor shall provide an ~~Maintenance and Operations Manual~~ **ECS Maintenance and Operations Position Descriptions** (DID 607/OP2). This document shall ~~define maintenance and operations requirements for the system elements and describe how the elements and subsystems shall be operated and maintained, including roles and responsibilities of M&O personnel~~. **identify the ECS maintenance, operations, engineering and ops support staff positions.**

The Contractor shall provide ~~Operator's Manuals~~ **Mission Operations Procedures** for each of the ECS elements in accordance with DID 611/OP3. The manuals shall provide the procedures and information necessary to ~~operate each system element/subsystem~~ **perform mission operations activities.**

The operational plans and manuals shall include procedures for handling operational anomalies and post anomaly analysis.

The Contractor shall provide Programmer's Manuals in accordance with DID 305/DV3 (P) 305/DV2 (F) 305/DV2 (U/D) for each of the ECS elements. The manuals shall describe programming aspects of the element computers in sufficient detail to support software sustaining engineering.

SOW Changes for DID 613

3.8.3.2 Maintenance

The Contractor shall provide the resources, personnel, tools, hardware, software, and logistics support required to maintain the ECS hardware, firmware, and software. The Contractor shall provide the capability to modify the ECS hardware, firmware, and software to operate under new host operating systems, to accommodate new hardware, and/or other approved system changes. As a minimum, this shall include the ability to:

a. Maintain, modify, or repair the system hardware and firmware, including testing the item(s) before returning them to an operational state;

b. Maintain, modify, install, integrate, and test the ECS software;

c. Maintain, diagnose, install, integrate, and test the COTS software;

d. Install, integrate, and test investigator software; and

e. Maintain portability among ECS COTS and developed applications software, databases, tables, and other operations software.

The Contractor shall develop and implement a COTS Maintenance Plan (DID 613/OP1 (P), 613/OP1 (F)) ~~prescribing policies and procedures~~ **describing the approach and processes** to be applied to maintenance of hardware, firmware, and software for which the Contractor has M&O responsibility. The hardware, firmware, and software shall be maintained according to this plan. The plan shall delineate the Preventive Maintenance (PM) for systems/equipment and provide a means for scheduling its accomplishment; provide a system of records to document maintenance, including both PM and corrective maintenance, as well as modifications; specify reports to be provided; ~~provide procedures~~ **and describe the process** for configuration control; ~~and specify training requirements and schedules.~~

The Contractor shall develop preventive and corrective maintenance procedures using STDN 402, System Maintenance Program, as a guideline. The Contractor shall include any state-of-the-art techniques that are developed and/or applicable to the ECS. Hardware maintenance procedures shall conform to NASA, GSFC, and/or other Government agency safety standards.

The Contractor shall develop and document in the COTS Maintenance Plan (DID 613/OP1(P), 613/OP1 (F)) policies and procedures for maintaining visibility and control of system problems using discrepancy reports or similar mechanisms. The same policies and procedures shall be applied to COTS hardware or software.

The Contractor shall maintain an ECS hardware, software, and firmware documentation library consistent with the needs at each of the ECS sites. This activity shall include the updating or procurement of ECS-related documents (schematics, user or technical reference guides, maintenance manuals, etc.) whenever ECS hardware, firmware, or software is modified or replaced. Updates to documents shall be made in accordance with configuration management procedures.

Facility layout of equipment and work areas including power, electrical, and air conditioning requirements shall be provided and maintained. Installation, administration, and maintenance guides shall be provided for each type of processor, software tool, and application.

The Contractor shall utilize trained and certified M&O personnel to maintain the ECS hardware, firmware, software, and supporting equipment. The Contractor shall provide maintenance subcontracts as needed with vendors of ECS hardware and software. The Contractor shall maintain software licenses with software vendors, the receipt of updates, new releases, etc. The phase-over of maintenance to the successor maintenance contractor shall include the transfer of system and site documentation, test equipment, test tools, site licenses, and related materials.

SOW Changes for DID 614

3.8.3.2.3 Software and Firmware Maintenance

The Contractor shall provide for complete software and firmware maintenance, including activities associated with producing, delivering, and documenting the corrections, modifications, and enhancements made to ECS software (including COTS) and firmware, and/or to adapt any COTS software for ECS use. The software and firmware maintenance activities shall include the maintenance and control of software and firmware documentation and configuration management, including change control, configuration status accounting, and quality assurance.

The Contractor shall develop a Developed Software Maintenance Plan in accordance with DID 614/OP1 and maintain ECS software (including COTS) and firmware in accordance with the policies and ~~procedures~~ **processes** specified in that plan and in the ECS Configuration Management Plan (DID 102/MG1).

The Contractor shall provide resources, including dedicated equipment and software tools and personnel to perform software and firmware maintenance, testing, and validation to maintain ECS functional, performance, and availability requirements. These resources and plans and a history of maintenance actions shall be provided to the successor contractor.

The Contractor software/firmware maintenance activity shall include services required to produce, deliver, install, test, and document corrections and modifications of existing ECS software and firmware. The maintenance activity shall include software/firmware CM, including change control, configuration status accounting, and software/firmware QA and shall provide software tools for the automation of these functions, including the reporting associated with these functions.

The Contractor shall provide the capability for integration, system testing, and validating ECS software and firmware.

The Contractor shall provide for maintenance of ECS software and firmware final design source code, executable code, and operational versions thereof.

SOW Changes for DID 616

3.8.2 Integrated Logistics Support (WBS 8.2)

The Contractor shall provide a systematic and comprehensive engineering/analytical approach in support of program design engineering and system engineering integration through operations. This support, commonly referred to as Integrated Logistics Support (ILS), shall provide for:

a. Analysis of design characteristics for integration of support considerations into system and equipment design;

b. Development of support requirements that are consistently related to design and to each other;

c. Management of support resources acquisition and utilization through the duration of the ECS.

ILS elements shall include maintenance, supply support, support and test equipment, packaging, handling, storage, transportation, personnel, training facilities, technical data and documentation, and ILS management and engineering support.

The Contractor shall prepare and implement an Integrated ~~Logistics~~ Support Plan in accordance with DID 616/OP2 and a Logistics Support Analysis Plan in accordance with DID 617/OP3.

When required by the findings of the Logistics Support Analysis, the Contractor shall prepare a recommended Replacement Parts List and Spare Parts List in accordance with DID 618/OP3 and a Test and Support Equipment Requirements List in accordance with DID 619/OP3.

The Contractor's logistics support shall consider the utilization of existing site capabilities.

The Contractor shall be a member of and support an Integrated Logistics Support Management Team (ILSMT) as established by the Government.

SOW Changes for DID 622

3.2.2.3 System Operations Planning

The Contractor shall plan for the operation of the ECS segments and elements and for their necessary support. These planning activities shall include (but not be limited to): the definition of system operations support, operations data management, and operational requirements; the development of operations scenarios and system operations procedures; the definition of multiple site intra-element interface and site-specific operational requirements; and requirements definition of software changes and documentation. Contractor activities for operations planning shall include cooperating and working with the spacecraft and instrument contractors to achieve cost-effective, efficient, and integrated flight operations. The ECS Contractor shall coordinate operations tasks with the EOS Mission Operations Manager (MOM) and the EOS Science Operations Manager (SOM) and provide support to EOS operations working groups.

The Contractor shall prepare an ECS Operations Concept Document in accordance with DID 604/OP1. The ECS Operations Concept shall be developed with the goal of minimizing life-cycle costs over the program lifetime while maintaining a maximum level of required system services. The Contractor shall provide in the ECS Operations Concept Document a description of how the ECS will appear to its users, including the assumptions about how operational tasks will be performed on the systems and how the users will interact with the systems.

The Contractor shall develop an ECS Operations Plan in accordance with DID 608/OP1 which shall describe the way ECS will appear to the users/operators, detail how operational tasks will be performed, and identify the training required. The ECS Operations Plan shall define the function of any necessary personnel training facilities and the methods by which newly trained personnel will be phased into system operations with minimum effect on operations. The Operations Plan shall also include the staffing plans necessary to implement the Contractor's operations concept.

The Contractor shall analyze requirements for ECS training and develop a training program. The Contractor shall provide an ECS Training Plan in accordance with DID 622/OP2 that addresses the ECS training requirements and describes the Contractor's training organization, curriculum, resources, schedule, and training methodology. The ECS Training Plan shall include subcontractor-provided training as applicable. The Plan shall address the qualifications required of the M&O personnel to meet position description skill requirements. The training methodology shall include, but not be limited to, computer assisted instruction, classroom training, supervised on-the-job

training, and audiovisual aids including video tape presentations by the subject matter experts. The plan shall also include trainee test and certification ~~procedures~~ **approach**.